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February 9, 2005

Mail Stop Appeal Brief - Patents  
Commissioner For Patents  
P.O. Box 1450  
Alexandria, Virginia 22313-1450

Re: Applicant(s): Donohoe, Brendan M., et. al.  
Assignee: Cardica, Inc.  
Title: Method and Apparatus for Creating an Opening in the Wall of a Tubular Vessel  
Serial No.: 10/054,745  
Examiner: Vy Q. Bui  
Docket No.: 057  
Filed: January 22, 2002  
Group Art Unit: 3731

Dear Sir:

Transmitted herewith are the following documents in the above-identified application:

- (1) Return Receipt Postcard;
- (2) This Transmittal Letter;
- (3) Appeal Brief Under 37 CFR 1.192 (1 copy, per 69 Fed. Reg. 19960); and
- (4) Check no. 11304 in the amount of \$750.00.

The amount of \$750.00 includes \$500.00 for filing a brief in support of an appeal, and \$250.00 that was inadvertently not paid when the Notice of Appeal was filed.


Small entity status is no longer claimed in this application, due to a license relating to this application.

- ☒ Conditional Petition for Extension of Time: If an extension of time is required for timely filing of the enclosed document(s) after all papers filed with this transmittal have been considered, an extension of time is hereby requested.
- ☐ Please charge our Deposit Account No. 502108 in the amount of \$ 750.00
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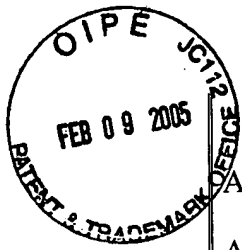
Respectfully submitted,

  
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Reg. No. 45,076

Adjustment date: 02/11/2005 MAHMED1  
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**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Applicant: Donohoe, Brendan M.; et. al.  
Assignee: Cardica, Inc.  
Title: Method and Apparatus for Creating an Opening in the Wall of a Tubular Vessel  
Serial No.: 10/054,745 Filing Date: January 22, 2002  
Examiner: Vy Q. Bui Group Art Unit: 3731  
Docket No.: 057

February 4, 2005

Mail Stop Appeal Brief - Patents  
Commissioner for Patents  
P. O. Box 1450  
Alexandria, VA 22313-1450

**APPEAL BRIEF UNDER 37 CFR §41.37**

This Appeal Brief is prepared and submitted pursuant to the Notice of Appeal filed in this case on December 10, 2004, in accordance with the new requirements of 69 Fed. Reg. 19960.

**I. REAL PARTY IN INTEREST**

The real party in interest is the assignee, Cardica, Inc., as named in the caption above.

**II. RELATED APPEALS AND INTERFERENCES**

No prior or pending appeals, interferences or other judicial proceedings are known to Appellant, Appellant's legal representative, or assignee which may be related to, directly

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affect or be directly affected by, or have a bearing on the decision by the Board of Patent Appeals in this appeal.

### **III. STATUS OF CLAIMS**

Claims 1, 3-6, 8-12, 16, 17, 20-22, 25-35, 37, 42 and 52-61 stand finally rejected. Claims 13-15, 19, 23, 24, 36, 38-41 and 43-51 have been objected to. These claims are set forth in the appendix attached hereto.

Claims 2, 7 and 18 have been withdrawn. These claims are not at issue and are not set forth in the appendix attached hereto.

The Examiner issued a restriction requirement in the Office Action dated August 11, 2004 ("Restriction Requirement"). Claims 1-53 were elected, and claims 54-61 were withdrawn, on August 17, 2004 ("Election"). However, the Final Action indicates that claims 1-61 are pending, and the Examiner examined the claims 54-61 (which had been withdrawn in the Election) in the Final Action. Thus, the Examiner has constructively withdrawn the Restriction Requirement, and claims 54-61 are pending in this application.

### **IV. STATUS OF AMENDMENTS**

No amendments were filed after final rejection or are currently pending in this case.

### **V. SUMMARY OF THE INVENTION**

#### **A. Claim 1**

Claim 1 is directed to a tool for making an incision in and removing tissue from a vessel wall, where that tool comprises a cutter (4) and a piercing member (6) positioned within the cutter (4), wherein the piercing member (6) and the cutter (4) are configured to

translate together to penetrate the wall of the vessel.<sup>1</sup> Claims 3-6 and 8-16 depend from independent claim 1, and thus add additional limitations to those present in independent claim 1.

#### **B. Claim 17**

Claim 17 is directed to a surgical tool for removing tissue from the wall of a vessel to create an opening, where that tool comprises a rotatable cutter (4); an auger assembly (10) fixed to and substantially coaxial with the cutter (4), the auger assembly (10) comprising an auger (6) at its distal end; and an actuator (24) connected to at least one of the auger assembly (10) and the cutter (4).<sup>2</sup> Claims 19-53 depend from independent claim 17, and thus add additional limitations to those present in independent claim 17.

#### **C. Claim 54**

Claim 54 is directed to a method for creating an opening in a vessel wall within a patient, where the method comprises advancing a piercing member (6) and a cutter (4) through the vessel wall, the cutter (4) axially fixed to and positioned at least partially around the piercing member (6), wherein the advancing cuts tissue from the vessel wall; and retracting the piercing member (6) and the cutter (4), whereby the cut tissue is removed from the vessel wall to form an opening therein.<sup>3</sup> Claims 55-61 depend from independent claim 54, and thus add additional limitations to those present in independent claim 1.

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<sup>1</sup> E.g., Specification, page 3, lines 13-24; page 6, line 24 through page 10, line 19; page 26, line 3 through page 30, line 13; Figures 1-5, 13 (exemplary reference characters indicated in text above).

<sup>2</sup> E.g., Specification, page 3, lines 13-24; page 4, lines 13-17; page 6, line 24 through page 11, line 18; page 26, line 3 through page 30, line 13; page 31, line 20 through page 32, line 10; Figures 1-5, 13 (exemplary reference characters indicated in text above).

<sup>3</sup> E.g., Specification, page 3, lines 13-24; page 6, line 24 through page 10, line 19; page 26, line 3 through page 30, line 13; page 33, line 2 through page 34, line 15; Figures 1-5, 13 (exemplary reference characters indicated in text above).

## **VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL**

### **A. Claims 1, 3-6 and 8-16**

Independent claim 1 stands finally rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,591,187 to Dekel ("Dekel"). Dependent claims 3-5 and 8-12 also stand rejected under Dekel.

Dependent claim 6 stands finally rejected under 35 U.S.C. §103(a) as being unpatentable over Dekel in view of U.S. Patent Application Publication No. 2001/0001124 of Mueller ("Mueller").

Dependent claim 16 stands finally rejected under 35 U.S.C. §103(a) as being unpatentable over Dekel in view of Donohoe.

### **B. Claims 17-53**

Independent claim 17 and dependent claims 19, 20, 22, 25, 26, 27, 30-35, 37 and 42 stand finally rejected under 35 U.S.C. §102(b) as being anticipated by Dekel.

Independent claim 17 and dependent claim 21 stand finally rejected under 35 U.S.C. §102(b) as being "anticipated by Donohoe."<sup>4</sup> The Final Action fails to identify a patent or publication number for this reference. Of necessity, it is assumed that the "Donohoe" reference here is U.S. Patent Application Publication No. 2002/0082626, which is later identified in the Final Action in the context of a 35 U.S.C. §103(a) rejection, and which was mailed along with the Final Action.

Dependent claims 28 and 29 stand finally rejected under 35 U.S.C. §103(a) over Dekel.

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<sup>4</sup> Office Action of November 17, 2004 ("Final Action"), page 5.

Dependent claims 52 and 53 stand finally rejected under 35 U.S.C. §103(a) as being unpatentable over Dekel in view of Donohoe.

### **C. Claims 54-61**

Independent claim 54 and dependent claims 57, 58, 60 and 61 stand finally rejected under 35 U.S.C. §102(b) as being anticipated by Dekel.

Dependent claims 55-56 and 59 stand finally rejected under 35 U.S.C. §103(a) as being unpatentable over Dekel in view of U.S. Pat. No. 6,488,693 to Gannoe ("Gannoe").

## **VII. ARGUMENTS**

### **A. The Cited Art Does Not Anticipate the Claims**

The MPEP sets forth the legal standard of anticipation under 35 U.S.C. §102: "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference."<sup>5</sup> (emphasis added).

#### **1. Claims 1, 3-6 and 8-16**

Claim 1 claims a "tool for making an incision in and removing tissue from a vessel wall, comprising: a cutter; and a piercing member positioned within said cutter, wherein said piercing member and said cutter are configured to translate together to penetrate the wall of the vessel." Dekel does not expressly or inherently describe each and every element of claim 1. As claimed, both the piercing member and the cutter translate together to penetrate the wall of the vessel. The specification confirms this plain meaning of the claim language: "The

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<sup>5</sup> MPEP 2131 (quoting *Verdegaal Brothers v. Union Oil of California*, 814 F.2d 628, 631 (Fed. Cir. 1987)).

distal end of the cutter 4 is sharpened to cut the wall of a tubular vessel.”<sup>6</sup> Indeed, the cutter is configured to penetrate “the entire vessel wall.”<sup>7</sup> The cutter and the piercing member “are configured to translate together to penetrate the wall of the vessel,” whether they are fixed to one another or rotationally independent from one another.<sup>8</sup> The piercing element and the cutter may translate together at the same rate.<sup>9</sup>

In contrast, Dekel neither expressly nor inherently describes a piercing member and a cutter configured to translate together to penetrate tissue. With regard to claim 1, the Final Action characterizes the corkscrew 20 of Dekel as analogous to the claimed piercing member, and the distal end 13 of the cutting device 12 of Dekel as analogous to the claimed cutter.<sup>10</sup> Dekel discloses a “cutting device 12 [having] a central longitudinal passageway 16 formed therein which is adapted to receive the shaft 22 of a T-handle device 18 having a corkscrew-like device 20 at the distal end thereof.”<sup>11</sup> “The shaft 22 is received for slidable and rotatable movement within the passageway 16” of the cutting device 12.<sup>12</sup> Consequently, the corkscrew 20 can translate and rotate relative to the cutting device 12 and relative to the distal end 13 of the cutting device 12. The distal end 13 of the cutting device 12 is at all times proximal to the distal end of the sheath 10, which has an internal bore that receives the cutting device 12.<sup>13</sup> The distal end of the sheath 10 includes serrations 10A, which do not cut or penetrate tissue, but rather “grip the tissue, thereby preventing the tissue from rotating as the

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<sup>6</sup> Specification, page 7, lines 3-4. *E.g.*, page 3, lines 14-19; page 4, lines 5-6; page 26, line 10 through page 27, line 14; page 29, line 11 through page 30, line 13.

<sup>7</sup> *Id.*; page 26, line 22.

<sup>8</sup> *Id.*, page 8, lines 14-15. *E.g.*, page 3, lines 13-24; page 9, lines 6-7; page 8, lines 15-23; page 29, lines 4-6

<sup>9</sup> *Id.*, page 8, lines 13-15.

<sup>10</sup> Final Action, page 2.

<sup>11</sup> Dekel, col. 4, lines 53-56.

<sup>12</sup> *Id.*, col. 4, lines 56-57.

<sup>13</sup> *Id.*, col. 4, lines 33-34; Figures 3-4.

rotating cutter 12 cuts into the tissue.”<sup>14</sup> To operate the tool of Dekel, “the corkscrew 20 is twisted via the T-handle 18 to engage the tissue sample. The corkscrew 20 is then retracted...which causes the specimen to be moved into engagement with the rotating auger 12 and the serrations 10A on the cylindrical sheath.”<sup>15</sup> That longitudinal retraction translates the corkscrew 20 proximally relative to the cutting device 12 in order to bring the tissue into engagement with the distal end 13 of the cutting device 12. Therefore, because the corkscrew 20 is translated toward the distal end 13 of the cutting device 12 to cut tissue, the corkscrew 20 and the distal end 13 of the cutting device 12 do not translate together in the distal direction to penetrate tissue. Indeed, the corkscrew 20 translates proximally, not distally, to pull tissue against the distal end 13 of the cutting device 12. Thus, Dekel does not disclose a piercing member and a cutter “configured to translate together,” as claimed in claim 1.

Further, because the distal end 13 of the cutting device 12 is proximal to the serrations 10A at the distal end of the sheath 10, the distal end 13 of the cutting device 12 does not and cannot penetrate tissue until the corkscrew 20 engages that tissue and moves that tissue proximally into contact with the distal end 13 of the cutting device 12. As a result, the corkscrew 20 and distal end 13 of the cutting device 12 of Dekel cannot translate together in the distal direction to penetrate tissue, and thus are not “configured to translate together to penetrate the wall of the vessel” as claimed in claim 1.

Second, in rejecting claim 1, the Final Action states: “[n]ote the rejections will flip the names of the cutting elements, as the different claim limitations require reinterpretation of the reference.”<sup>16</sup> Such creative reinterpretation, especially without providing any explanation or grounds for doing so, is arbitrary. Further, to “flip” the names of the cutting elements

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<sup>14</sup> *Id.*, col. 5, lines 37-39; col. 6, lines 24-25.

<sup>15</sup> *Id.*, col. 6, lines 19-23; col. 5, lines 28-34.

<sup>16</sup> Final Action, page 2.



(presumably, the “cutter” and the “piercing member”; the “cutting elements” stated in the Final Action are unidentified), the meanings of those claim terms are necessarily “flipped.” That is, the contents of Dekel cannot be reinterpreted without simultaneously reinterpreting the language of the claims. However, a patent claim is not “a nose of wax which may be turned and twisted in any direction...so as to make it include something more than, or something different from, what its words express.”<sup>17</sup> “Reinterpretation” of the same claim terms in different claims treats those claim terms as a “nose of wax,” contrary to law.

Under the Administrative Procedure Act (5 U.S.C. § 706) federal administrative agencies such as the Patent and Trademark Office must support their decisions with substantial evidence for those decisions to be valid:

A reviewing court reviews an agency’s reasoning to determine whether it is “arbitrary” or “capricious,” or, if bound up with a record-based factual conclusion, to determine whether it is supported by “substantial evidence.”<sup>18</sup>

The “reinterpretation” of Dekel was arbitrary and capricious, and therefore in violation of the Administrative Procedure Act.

Claim 1 is generic, so allowance of generic claim 1 would be to all species, including the species of withdrawn dependent claims 2 and 7, which would therefore be reinstated in this patent application. Claims 2-16 depend directly or indirectly from claim 1, and are thus believed to be in condition for allowance as well under MPEP 608.01(n)(III). However, for completeness, the rejections of dependent claims are discussed below.

The Final Action provided no grounds of rejection for dependent claims 4, 8, 10, 11 and 12, instead merely reciting the contents of each of those claims. The MPEP states that the

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<sup>17</sup> *White v. Dunbar*, 119 U.S. 47, 51 (1950).

<sup>18</sup> *Dickinson v. Zurko*, 1999 U.S. Lexis 4004, \*24; 527 U.S. 150 (1999) (citing *SEC v. Chenery Corp.*, 318 U.S. 80, 89-93(1943)).

grounds of rejection of any claim should be “fully and clearly stated.”<sup>19</sup> However, by providing no rationale at all for rejecting these claims under 35 U.S.C. § 102(b), the Final Action does not meet the requirements of the MPEP. The failure to set forth any grounds for rejecting these claims, as required by the MPEP, was arbitrary and capricious, and therefore in violation of the Administrative Procedure Act.

With regard to claim 3, first, Dekel fails to expressly or inherently describe each and every element of the claim. The Final Action states that, with regard to claim 3, “the piercing member is element 13 [of Dekel] and the cutter is element 34 [of Dekel]. Note, the piercing member and the cutter are now fixed rotationally.”<sup>20</sup> The feeding window 34 of Dekel is simply an opening in the side of the sheath 10.<sup>21</sup> To the contrary, the cutting device 12 is “adapted to be rotated” relative to the sheath 10, which “has an internal bore which receives an auger or drill-like cutting device 12, which is disposed longitudinally and concentrically within the sheath 10.”<sup>22</sup> Indeed, in the operation of the tool, “tissue...can be manipulated into position adjacent the window to feed the tissue into the rotating cutting blade of the cutting device 12.”<sup>23</sup> Thus, if the claimed cutter is considered to be analogous to the window 34 of Dekel and the claimed piercing member is considered to be analogous to the distal end 13 of the cutting device 12, the piercing member rotates relative to the cutter. However, claim 3 requires that “said piercing member is rotationally fixed to said cutter,” which is completely opposite of what Dekel describes. Additionally, the cutting device 12 does not extend through the window 34, and is merely adjacent to the window 34. Thus, where the claimed cutter is considered to be analogous to the window 34, the combination of the opening 34 and

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<sup>19</sup> MPEP 707.07(d).

<sup>20</sup> Final Action, page 2.

<sup>21</sup> Dekel, col. 5, lines 12-19; Figures 1, 3, 4.

<sup>22</sup> *Id.*, col. 4, lines 32-36.

the cutting device 12 does not expressly or inherently describe the claimed “cutter; and a piercing member positioned within said cutter.” (emphasis added). Thus, Dekel fails to expressly or inherently describe each and every element claimed in claim 3.

Second, as stated above with regard to claim 1, the “reinterpretation” of Dekel, without providing any explanation or grounds for such action, was arbitrary and capricious, and therefore in violation of the Administrative Procedure Act.

With regard to claim 9, the claim requires that “said piercing member holds the tissue removed from the wall of the vessel.” In contrast, neither the cutting device 12 nor the corkscrew 20 of Dekel holds tissue removed from the wall of a vessel or anywhere else. Instead, “[t]he cut tissue is then propelled by the rotating auger device 12 against the dam 32 into the tissue reservoir 30.”<sup>24</sup> The “reservoir 30 is provided for receiving tissue conveyed by the rotating cutting device.”<sup>25</sup> Thus, Dekel fails to describe a piercing member that holds tissue removed from the wall of a vessel or anywhere else, and thereby fails to describe each and every element of claim 9.

With regard to claim 10, the claim term “hemostatic” is related to the flow of blood. Blood, much less blood flow, is not expressly or inherently described in Dekel. Thus, Dekel does not and cannot disclose a cutter that is substantially hemostatic.

## 2. Claims 17-53

Claim 17 claims a “surgical tool for removing tissue from the wall of a vessel to create an opening, comprising: a rotatable cutter; an auger assembly fixed to and substantially coaxial with said cutter, said auger assembly comprising an auger at its distal end; [and] an

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<sup>23</sup> *Id.*, col. 5, lines 12-15.

<sup>24</sup> *Id.*, col. 6, lines 14-16.

<sup>25</sup> *Id.*, col. 5, lines 6-8.

actuator connected to at least one of said auger assembly and said cutter.”

First, Dekel does not expressly or inherently describe each and every element of claim 17. Claim 17 claims, among other elements, “an auger assembly fixed to...said cutter.” The specification confirms that, in one embodiment, “[t]he auger assembly 10 is fixed to the cutter 4.”<sup>26</sup> The auger 6 is located at the distal end of the auger assembly 10.<sup>27</sup> “Because the auger and the cutter are fixed to one another, they rotate and advance together to penetrate the wall of a tubular vessel and cut tissue from it.”<sup>28</sup> This is consistent with the dictionary definition of the word “fixed,” which means “firmly placed or attached, not movable.”<sup>29</sup> Thus, for the auger assembly to be fixed to the cutter, it is not movable relative to the cutter.

In contrast, Dekel neither expressly nor inherently describes an auger assembly fixed to a cutter. As with claim 1, the Final Action characterizes the corkscrew 20 as analogous to the claimed piercing member, and the distal end 13 of the cutting device 12 as analogous to the claimed cutter.<sup>30</sup> Dekel discloses a “cutting device 12 [having] a central longitudinal passageway 16 formed therein which is adapted to receive the shaft 22 of a T-handle device 18 having a corkscrew-like device 20 at the distal end thereof.”<sup>31</sup> “The shaft 22 is received for slidable and rotatable movement within the passageway 16.”<sup>32</sup> Consequently, the corkscrew 20 can translate and rotate relative to the distal end 13 of the cutting device 12, and thereby is clearly not fixed to the cutting device 12 or the distal end 13 of the cutting device 12, because the term “fixed” means not movable. Thus, Dekel fails to describe the claimed

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<sup>26</sup> Specification, page 7, line 18; Figures 2-5.

<sup>27</sup> *Id.*, page 7, lines 24-25.

<sup>28</sup> *Id.*, page 3, lines 14-16.

<sup>29</sup> WEBSTER’S NEW WORLD DICTIONARY, SECOND COLLEGE EDITION 528 (1978).

<sup>30</sup> Final Action, page 2.

<sup>31</sup> Dekel, col. 4, lines 53-56.

<sup>32</sup> *Id.*, col. 4, lines 56-57.

“auger assembly fixed to...said cutter.”

Further, to operate the tool of Dekel, utilizing the cited cutting device 12 and the corkscrew 20, “the corkscrew 20 is twisted via the T-handle 18 to engage the tissue sample. The corkscrew 20 is then retracted...which causes the specimen to be moved into engagement with the rotating auger 12 and the serrations 10A on the cylindrical sheath.”<sup>33</sup> That longitudinal retraction translates the corkscrew 20 proximally relative to the cutting device 12 in order to bring the tissue into engagement with the distal end 13 of the cutting device 12. Thus, not only is the corkscrew 20 not fixed or attached to the cutting element 12, it must be free to move relative to the cutting element 12, or else the device of Dekel would be inoperative. As a result, Dekel does not and cannot describe, expressly or inherently, “an auger assembly fixed to...said cutter.”

Claims 18-53 depend directly or indirectly from claim 17, and are thus believed to be in condition for allowance as well under MPEP 608.01(n)(III).

The Final Action provided no grounds of rejection for dependent claims 26, 27, 31, 35 and 37, instead merely reciting the contents of each of those claims. The MPEP states that the grounds of rejection of any claim should be “fully and clearly stated.”<sup>34</sup> As set forth above with regard to claims that depend from claim 1, the failure to set forth any grounds for rejecting these claims, as required by the MPEP, was arbitrary and capricious, and therefore in violation of the Administrative Procedure Act.

Claim 19 further limits claim 17, by claiming “wherein said actuator is a coil spring.” The Final Action states that “the actuator (21) of Dekel is attached to auger (20) via the rod (22).”<sup>35</sup> However, in the rejection of claim 17, the Final Action characterizes the actuator as

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<sup>33</sup> *Id.*, col. 6, lines 19-23; col. 5, lines 28-34.

<sup>34</sup> MPEP 707.07(d).

<sup>35</sup> Final Action ,page 3.

being the shaft 22 of Dekel.<sup>36</sup> Either the shaft 22 is the actuator or the spring 21 is the actuator. The re-characterization of claim terms in different claims, particularly claims in the same family, is arbitrary and capricious, and violates the Administrative Procedure Act.

Claim 20 claims "said actuator is retractable." The Final Action states that "Dekel discloses the tool can be disassembled," but neglects to cite where Dekel discloses such a thing.<sup>37</sup> That statement forms the entire grounds of rejection of claim 20, and implies that disassembly is the same thing as retraction. The word "disassemble" means "[t]o take apart into constituent parts."<sup>38</sup> The word "retract" means "to draw back or in."<sup>39</sup> The word "retractable" is simply the adjectival form of the verb "retract," and therefore means "able to be drawn back or in." Thus, the word "retractable" in the claim refers to a capability of motion of the actuator, while the word "disassembly" has nothing to do with motion, instead referring to taking something apart. Further, a tool that is taken part into its constituent parts is not operative; it is merely a collection of parts. Thus, the implication that disassembly is the same as retraction is simply wrong.

Claim 22 claims that "said cutter is vented." As explained in the specification, "[a]t least one vent 20 is defined in the auger assembly 10 at or proximal to the proximal end of the cutter 4. The vent 20 connects a space inside the cutter 4 with a space outside the cutter 4."<sup>40</sup> "The cutter 4 is vented to prevent fluid from becoming trapped within the cutter 4, because the pressure of that trapped fluid could potentially prevent the cutter 4 from penetrating the vessel wall or other anatomical structure."<sup>41</sup> This is consistent with the dictionary definition

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<sup>36</sup> *Id.*

<sup>37</sup> *Id.*

<sup>38</sup> MCGRAW HILL DICTIONARY OF SCIENTIFIC AND TECHNICAL TERMS, FOURTH EDITION 555 (1989).

<sup>39</sup> WEBSTER'S NEW WORLD DICTIONARY, SECOND COLLEGE EDITION 1215 (1978).

<sup>40</sup> Specification, page 10, lines 20-22.

<sup>41</sup> *Id.*, page 11, lines 2-4.

of “vent”, which is “an opening provided for the discharge of pressure or the release of pressure.”<sup>42</sup> “Vented” is simply the adjectival form of “vent”, thereby meaning “having an opening provided for the discharge of pressure or the release of pressure.”

The Final Action states that “[v]ented can be exposed to air. Such as John vented his shorts out the window. [sic]”<sup>43</sup> We prefer to believe that this example was an attempt at lightheartedness. Nevertheless, that example is as inaccurate as it is unfunny. The definition of “vented” used by the Examiner is not consistent with the standard usage of the word, as determined from its dictionary definition and its use in the specification. “Vented” does not mean “can be exposed to air;” rather, it means “having an opening provided for the discharge of pressure or the release of pressure.”

The Final Action concluded by stating that “since element 13 is movable outside the casing 18, it is considered to be vented.”<sup>44</sup> First, this characterization of “vented” is at odds with the standard meaning of “vented,” as established above. Whether something is movable is irrelevant to whether it has an opening provided for the discharge of pressure or the release of pressure. Nowhere does the Final Action identify any such opening in Dekel, and for good reason: Dekel describes no such opening. Second, the Final Action refers to the “casing 18” in its rejection of claim 22. The item 18 in Dekel is a T-handle, not a casing.<sup>45</sup> Further, no “casing” is claimed in claim 22, or is relevant to any structure claimed in claim 22. Thus, Dekel fails to expressly or inherently disclose each and every element of claim 22.

With regard to claim 25, the claim language includes “a casing, said casing comprising a contact structure at its distal end.” The claimed casing is substantially hollow, and protects

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<sup>42</sup> MCGRAW HILL DICTIONARY OF SCIENTIFIC AND TECHNICAL TERMS, FOURTH EDITION 2022 (1989).

<sup>43</sup> Final Action, page 3.

<sup>44</sup> *Id.*, page 3.

<sup>45</sup> Dekel; *e.g.*, col. 4, lines 53-56; col. 6, lines 18-20; Figures 1, 5.

one or more of the claimed components.<sup>46</sup> The Final Action fails to identify any structure of Dekel as corresponding to the claimed casing, but characterizes the claimed contact structure as corresponding to reference number 8 of Dekel. However, reference number 8 is a “[j]agged line 8 [that] reveals a cutaway portion of a part of the device.”<sup>47</sup> Thus, the reference number 8 is not even a component of Dekel, but instead is a drafting convention to reveal the interior of the tool. Further, the jagged line 8 is not at the distal end of any structure of Dekel, and therefore cannot correspond to a “casing comprising a contact structure at its distal end.” Further, if the sheath 10 was intended to be characterized as analogous to the claimed casing, such characterization is fatally inconsistent with the rejection of claim 22, in which the casing was characterized as corresponding to the T-handle 18.

Claim 30 claims “a seal housing; and an introducer tip connected to said seal housing, wherein said auger and said cutter are configured to slide through said introducer tip.” Referring to the specification, “[t]he seal housing 34 is a substantially hollow structure into which the proximal end of the auger assembly 10 extends.”<sup>48</sup> “The seal housing 34 includes an opening 36 at or near its distal end through which the introducer tip 28 and the auger assembly 10 extend.”<sup>49</sup> “The introducer tip 28...is a radially and bilaterally symmetrical shell.”<sup>50</sup> “The introducer tip 28 follows the cutter 4 and the auger 6 into the vessel wall, and remains in the opening thus formed, in order to provide hemostasis with regard to that opening....Fluid such as blood enters the seal housing 34 through the introducer tip 28, and the seal housing 34 maintains hemostasis with regard to the fluid in the vessel.”<sup>51</sup> Thus, the

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<sup>46</sup> Specification, page 19, lines 2-4; Figure 11.

<sup>47</sup> Dekel; col. 4, lines 17-19.

<sup>48</sup> Specification, page 12, lines 17-19; Figures 1, 4, 11.

<sup>49</sup> *Id.*, page 12, lines 19-20.

<sup>50</sup> *Id.*, page 11, lines 20-23

<sup>51</sup> *Id.*, page 27, lines 15-21.



introducer tip 28 and seal housing 34 are substantially hollow structures that maintain hemostasis of a vessel after the cutter 4 and auger 6 have made an opening in the wall of that vessel.

In contrast, the Final Action characterizes the dam 32 of Dekel as corresponding to the seal housing 34. Dekel does not disclose whether the dam 32 is hollow, and the dam 32 is illustrated as a solid disc.<sup>52</sup> Thus, the solid dam 32 cannot anticipate the claimed seal housing, which is substantially hollow.

Further, claim 30 requires that both “said auger and said cutter are configured to slide through said introducer tip.” The Final Action characterizes the cutter as the distal end 13 of the cutting device 12, and the introducer tip as the jagged line 8, already established as a drafting artifact rather than an actual structure.<sup>53</sup> Nowhere does Dekel disclose that the cutting device 12 is configured to slide at all, much less relative to the dam 32. Indeed, the dam 32 would interfere with the proximal motion of the cutting device 12 that would be required to move the distal end 13 of the cutter 12 to the position of the jagged line 8.<sup>54</sup> Thus, Dekel neither expressly nor inherently describes each and every element of claim 30.

Further, the characterization of the jagged line 8 as corresponding to the introducer tip is inconsistent with the rejection of claim 25, in which the jagged line 8 was characterized as a contact structure at the distal end of a casing, and therefore is arbitrary and capricious in violation of the Administrative Procedure Act.

The rejection of claim 32 includes an improper inherency rejection. The Final Action states that “[t]he introducer can be inherently expanded by heating for example.”<sup>55</sup> (emphasis

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<sup>52</sup> Dekel, Figures 1, 3, 4.

<sup>53</sup> Final Action, page 4.

<sup>54</sup> Dekel; e.g., Figures 1, 3, 4.

<sup>55</sup> Final Action, page 4.

in original). This inherency rejection is unsupported, contrary to the requirements of the MPEP: “In relying upon the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art.”<sup>56</sup> Because the Final Action provides no support for this inherency rejection, contrary to the requirements of the MPEP, that rejection was improper. Further, “heating” is not claimed in claim 32, nor is heating disclosed anywhere in Dekel.

Claim 33 claims, among other elements, a seal housing that comprises at least one guide. The seal housing 34 is described in the specification, as set forth above. Each guide “is defined in or connected to the inner surface of the seal housing 34.”<sup>57</sup> The guide or guides 35 guide the auger 6, cutter 4 and captured tissue away from the axis of the introducer tip 28 to a second axis spaced apart from the introducer axis.<sup>58</sup> However, as established above, Dekel fails to disclose a seal housing, and consequently does not and cannot disclose a seal housing that comprises at least one guide. Further, although the Final Action states that “said seal housing comprises at least one guide (D3),” it fails to identify any structure in Dekel that corresponds to the claimed guide.<sup>59</sup> The rejection of claim 34 in the Final Action directs attention to a sheet attached to a previous Office Action; that sheet is attached as Exhibit 3. That sheet also includes an annotation D3, which appears to point to the gear 16A. The gear 16A is attached to the cutting device 12, not to any seal or seal housing.<sup>60</sup> Thus, the gear 16A is not a guide. Tellingly, no actual reference numbers in Dekel were utilized in characterizing

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<sup>56</sup> MPEP 2112 (*citing Ex parte Levy*, 17 U.S.P.Q.2d 1461, 1464 (Bd. Pat. App. & Inter. 1990)) (emphasis in original).

<sup>57</sup> Specification, page 14, line 1.

<sup>58</sup> *Id.*, page 14, lines 8-11.

<sup>59</sup> Final Action, page 4.

<sup>60</sup> Dekel, Figures 1, 3, 4.

a component thereof as the claimed guide, which indicates that Dekel does not disclose any structure corresponding to the claimed guide.

Claim 34 depends from claim 33, and claims “a bushing connected to said coil spring, said bushing comprising at least one guide follower configured to engage said guide.” As shown above, Dekel fails to disclose a guide. Further, the Final Action again creates reference numbers in an attempt to characterize vaguely-identified regions of Dekel as corresponding to the claimed structure. The supposed “guide follower D2” appears to be merely another gear 16A that engages the other gear 16A.<sup>61</sup> Further, the supposed “bushing D3” is identified as a circle that appears to encompass the gears 16A, the dam 32, and part of a hand crank 14.<sup>62</sup> This vaguely-defined basket of parts, which includes two gears in perpendicular engagement with one another, bears no resemblance to the common-understood meaning of the term “bushing.”

Claim 42 claims “at least one rib [that] extends substantially axially along [a] first driveshaft.” The Final Action states that “each coil in the 32 is a rib. [sic]”.<sup>63</sup> Reference number 32 in Dekel is the dam 32, as described above. Nowhere does Dekel state that the dam 32 is a coil or has coils; it is a solid disc. As a result, it is impossible to determine what is meant by that statement in the final rejection. Further, the Final Action characterizes the claimed first driveshaft as having reference number 18. The item 18 in Dekel is a T-handle, not a driveshaft of any kind.<sup>64</sup> Thus, Dekel fails to disclose each and every element claimed in claim 42.

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<sup>61</sup> Exhibit 3; Dekel, Figures 1, 3, 4.

<sup>62</sup> Exhibit 3.

<sup>63</sup> Final Action, page 4.

<sup>64</sup> Dekel; e.g., col. 4, lines 53-56; col. 6, lines 18-20; Figures 1, 5.

### 3. Claims 54-61

Claim 54 claims a “method for creating an opening in a vessel wall within a patient, comprising: advancing a piercing member and a cutter through the vessel wall, said cutter axially fixed to and positioned at least partially around said piercing member, wherein said advancing cuts tissue from the vessel wall; and retracting said piercing member and said cutter, whereby the cut tissue is removed from the vessel wall to form an opening therein.”

Claim 54 requires “advancing a piercing member and a cutter through the vessel wall, said cutter axially fixed to...said piercing member.” “That is, the auger and the cutter are fixed with respect to translation, but not with respect to rotation.”<sup>65</sup> In contrast, the corkscrew 20 of Dekel can translate and rotate relative to the cutting device 12 and relative to the distal end 13 of the cutting device 12, as established above with respect to claim 1. Thus, Dekel fails to disclose the claimed cutter axially fixed to a piercing member.

Also, Dekel does not disclose advancing both a piercing member and a cutter through a vessel wall, or through tissue of any kind. In Dekel, “the corkscrew 20 is twisted via the T-handle 18 to engage the tissue sample. The corkscrew 20 is then retracted...which causes the specimen to be moved into engagement with the rotating auger 12 and the serrations 10A on the cylindrical sheath.”<sup>66</sup> That longitudinal retraction translates the corkscrew 20 proximally relative to the cutting device 12 in order to bring the tissue into engagement with the distal end 13 of the cutting device 12. That is, tissue is moved proximally into engagement with the distal end 13 of the cutting device 12; the distal end of the cutting edge 13 is not advanced as is required by claim 54. Further, the “purpose of the serrations 10A is to grip the tissue.”<sup>67</sup> Such serrations 10A at the distal end of the sheath 10 could not grip the tissue of a vessel wall

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<sup>65</sup> Specification, page 3, lines 21-22.

<sup>66</sup> *Id.*, col. 6, lines 19-23; col. 5, lines 28-34.

<sup>67</sup> Dekel, col. 5, lines 37-39.

if they were advanced through the vessel wall into an interior of the vessel, because they would be located in a volume of space having no tissue to grip. Further, Dekel does not disclose a method of utilizing a surgical tool for performing any actions on a vessel wall, much less advancing any structure through a vessel wall. Indeed, vessels of any kind are notably absent from Dekel.

Claim 54 also requires “retracting said piercing member and said cutter, whereby the cut tissue is removed from the vessel wall to form an opening therein.” In contrast, Dekel does not disclose retracting both a piercing member and a cutter to remove cut tissue from any structure to form an opening therein. Rather, in Dekel, tissue is “removed by the conveying action of the rotating flutes of the device 12, which acts as a rotary conveyor to convey the tissue along the longitudinal length of the device, whereby it impacts against the dam 32, which causes the tissue then to be diverted into and received in the reservoir 30.”<sup>68</sup> That is, cut tissue of Dekel is removed by the rotary conveyor action of the cutting device 12 alone. Thus, Dekel fails to teach retracting a piercing member and a cutter, whereby the cut tissue is removed from the vessel wall to form an opening therein. Thus, Dekel fails to expressly or inherently describe each and every element claimed in claim 54.

Further, the Final Action provided no grounds of rejection for independent claim 54 or for dependent claims 58, 60 and 61, instead merely reciting the contents of each of those claims. As set forth above with regard to claims that depend from claim 1, the failure to set forth any grounds for rejecting these claims, as required by the MPEP, was arbitrary and capricious, and therefore in violation of the Administrative Procedure Act.

Claims 55-61 depend directly or indirectly from claim 54, and are thus believed to be in condition for allowance as well under MPEP 608.01(n)(III).

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<sup>68</sup> Dekel, col. 5, lines 38-43.

Claim 57 depends from claim 54, and further claims “providing hemostasis at the opening.” This hemostasis is provided “during and after creation of the opening.”<sup>69</sup> The Final Action contends that hemostasis “will be done automatically by the body during the natural healing process.”<sup>70</sup> This statement misses the point. First, the claimed hemostasis is provided during the creation of the opening; the postulated natural healing process would take place well after the method was completed. Second, the method is used on blood vessels such as the aorta.<sup>71</sup> If an opening in the aorta were left alone with no hemostasis after a surgical procedure, the patient would die from blood loss through that opening well before it could close through “the natural healing process.” Thus, Dekel fails to describe each and every element of claim 57.

#### **B. The Cited Art Does Not Render The Claims Obvious**

MPEP 706.02(j) states:

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on applicant’s disclosure. *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q. 1438 (Fed. Cir. 1991) (emphasis added).

##### 1. Claims 1, 3-6 and 8-16

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<sup>69</sup> Specification, page 4, lines 9-12 (emphasis added).

<sup>70</sup> Final Action, page 5.

<sup>71</sup> Specification; e.g., page 7, line 4.

Claims 6 and 16 each depend from independent claim 1, which is believed to be allowable as discussed above, and are thus believed to be in condition for allowance as well under MPEP 608.01(n)(III).

In addition, Dekel does not disclose a “piercing member and...cutter...configured to translate together,” as set forth above with regard to claim 1. Mueller similarly fails to disclose those claim elements. Mueller discloses a tubular needle 30 and an inner needle 20 and/or piercing tips 440, 440’, 440” that are both rotatable and translatable through the lumen of the needle 20.<sup>72</sup> Nowhere does Mueller teach or suggest “piercing member and...cutter...configured to translate together,” as required by claim 1.

Thus, a prima facie case of obviousness has not been established, and claims 6 and 16 are allowable.

## 2. Claims 17-53

Claims 28, 29, 52 and 53 each depend from independent claim 17, which is believed to be allowable over Dekel as discussed above, and are thus believed to be in condition for allowance as well under MPEP 608.01(n)(III).

## 3. Claims 54-61

Claims 55-56 and 59 each depend from independent claim 54, which is believed to be allowable as discussed above, and is thus believed to be in condition for allowance as well under MPEP 608.01(n)(III).

In addition, neither Dekel nor Gannoe teach or suggest “releasing a quantity of stored energy,” “wherein said releasing produces an impulsive force on said auger and said cutter,”

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<sup>72</sup> Mueller, e.g., paragraphs 0025, 0029, 0030, 0041-0044; Figures 1A, 1E, 3A-3C.

as required by claim 56. "A force that acts on a body for a short time but produces a large change in its linear or angular momentum is called an impulsive force. As used in this document, the term "impulse source" refers to a source of such an impulsive force."<sup>73</sup> Dekel neither discloses nor suggests anything regarding the duration over which a force is to be exerted. The fact that the preferred embodiment utilizes a hand crank indicates that duration is substantial, and that the resultant force is not and cannot be impulsive. Gannoe also fails to disclose or suggest the use of an impulsive force.

Further, the Final Action states that Dekel suggests "that this tool can be operated by a hydraulic mechanism."<sup>74</sup> The use of a hydraulic mechanism is completely independent of whether or not that hydraulic mechanism produces an impulsive force, as the term "impulsive force" is defined in the specification of this patent application. The statement in the Final Action that Dekel "also discloses that spring could apply an impulsive force in the reverse direction" is simply wrong, and contains no citation to any part of Dekel or any explanation of how the spring could do so.<sup>75</sup> Thus, a prima facie case of obviousness has not been established.

## VII. CONCLUSION

For the above reasons, Applicants respectfully submit that the Final Action's rejection of pending claims 1, 3-6, 8-12, 16, 17, 20-22, 25-35, 37, 42 and 52-61 was unfounded. Accordingly, Applicants request that the rejection of those claims be reversed, that those

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<sup>73</sup> Specification, page 15, lines 22-24.

<sup>74</sup> Final Action, page 6.

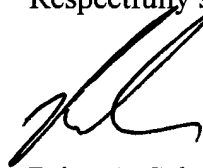
<sup>75</sup> *Id.*, page 6.



claims be allowed, and that species claims 2 and 7 be reinstated as a result of allowance of generic claim 1.

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Respectfully submitted,



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## APPENDIX 1 -CLAIMS

1. A tool for making an incision in and removing tissue from a vessel wall, comprising:
  - a cutter; and
  - a piercing member positioned within said cutter, wherein said piercing member and said cutter are configured to translate together to penetrate the wall of the vessel.
3. The tool of claim 1, wherein said piercing member is rotationally fixed to said cutter.
4. The tool of claim 1, wherein said cutter is a curved blade having a substantially circular distal end.
5. The tool of claim 1, wherein said cutter is a curved blade having an open perimeter at its distal end.
6. The tool of claim 1, wherein the distal end of said cutter is beveled inward.
8. The tool of claim 1, wherein the distal tip of said piercing member extends further in the distal direction than the distal end of said cutter.
9. The tool of claim 1, wherein said piercing member holds the tissue removed from the wall of the vessel.
10. The tool of claim 1, wherein said cutter is substantially hemostatic.

11. The tool of claim 1, wherein said piercing member is an auger.
12. The tool of claim 11, wherein said auger and said cutter are substantially coaxial.
13. The tool of claim 11, wherein said auger comprises:
  - a spike;
  - a shaft connected to and extending distally from said spike, said shaft fixed to said cutter.
14. The tool of claim 13, wherein said spike is substantially conical at its distal end.
15. The tool of claim 14, wherein the width of the proximal end of said spike is greater than the width of said shaft.
16. The tool of claim 11, wherein at least one flute is defined in said auger.
17. A surgical tool for removing tissue from the wall of a vessel to create an opening, comprising:
  - a rotatable cutter;
  - an auger assembly fixed to and substantially coaxial with said cutter, said auger assembly comprising an auger at its distal end;
  - an actuator connected to at least one of said auger assembly and said cutter.

19. The surgical tool of claim 17, wherein said actuator is a coil spring.
20. The surgical tool of claim 17, wherein said actuator is retractable.
21. The surgical tool of claim 17, wherein said actuator extends away from the axis of said cutter.
22. The surgical tool of claim 17, wherein said cutter is vented.
23. The surgical tool of claim 22, wherein said auger further comprises at least one centering flange between and connected to said auger and said cutter, wherein each said centering flange comprises a slot extending therethrough.
24. The surgical tool of claim 23, wherein at least one centering flange comprises a substantially circumferential groove defined therein.
25. The surgical tool of claim 17, further comprising a casing, said casing comprising a contact structure at its distal end, wherein said auger and said cutter translate relative to said contact structure.
26. The surgical tool of claim 25, wherein said contact structure has an open perimeter.
27. The surgical tool of claim 25, wherein said auger and said cutter translate distally a selected amount relative to said contact structure.

28. The surgical tool of claim 17, further comprising a knob operatively connected to said coil spring.

29. The surgical tool of claim 28, wherein said knob is rotatable through two or more positions, and wherein actuation of said auger and said cutter is controlled by rotation of said knob.

30. The surgical tool of claim 17, further comprising  
a seal housing; and  
an introducer tip connected to said seal housing, wherein said auger and said cutter are  
configured to slide through said introducer tip.

31. The surgical tool of claim 30, wherein said auger and said cutter are configured for withdrawal into said seal housing.

32. The surgical tool of claim 30, wherein said introducer tip is expandable.

33. The surgical tool of claim 30, wherein said seal housing comprises at least one guide.

34. The surgical tool of claim 33, further comprising a bushing connected to said coil spring, said bushing comprising at least one guide follower configured to engage said guide.

35. The surgical tool of claim 33, wherein said introducer defines a first axis, and wherein

said guide extends away from said first axis.

36. The surgical tool of claim 33, wherein said introducer defines a first axis, and wherein said coil spring is moveable in a direction at an angle to said first axis.

37. The surgical tool of claim 17, wherein the distal end of said auger extends distally beyond the distal end of said cutter.

38. The surgical tool of claim 17, further comprising an impulse source configured to rotate and translate said auger and said cutter.

39. The surgical tool of claim 38, wherein said impulse source is a spring.

40. The surgical tool of claim 38, further comprising:

a rotatable first driveshaft connected to said coil spring; and

a axially fixed first gear comprising an opening through which said first driveshaft

extends, wherein said first driveshaft is slidable relative to said first gear, and

wherein rotation of said first gear causes said first driveshaft to rotate.

41. The surgical tool of claim 40, wherein said first driveshaft comprises at least one rib aligned extending substantially radially outward and said first gear comprises a passage therethrough configured to engage said at least one rib.

42. The surgical tool of claim 41, wherein said at least one rib extends substantially axially

along said first driveshaft.

43. The surgical tool of claim 40, further comprising a carriage having a threaded passage therein, said first driveshaft further comprising a threaded portion configured to engage said threaded passage, wherein rotary motion of said first driveshaft causes said first driveshaft to translate distally relative to said carriage.

44. The surgical tool of claim 43, further comprising:

a second driveshaft; and

a second gear connected to said second driveshaft, said second gear configured to engage said first gear, wherein rotation of said second gear causes said first gear to rotate.

45. The surgical tool of claim 44, further comprising at least one registration member extending from at least one of the second driveshaft and the second gear.

46. The surgical tool of claim 45, wherein at least one said registration member is configured to restrain said second driveshaft against rotational motion and allow translational motion.

47. The surgical tool of claim 44, further comprising:

a cam cylinder operationally connected to said auger and said cutter, said cam cylinder comprising at least one cam path defined therein; and  
a knob connected to said cam cylinder.

48. The surgical tool of claim 47, wherein said auger and said cutter are actuated based on the position of said knob.

49. The surgical tool of claim 47, further comprising:

an introducer tube;

a first cam follower connected to said introducer tube; and

a second cam follower connected to said carriage;

wherein each said cam follower rides within one said cam path.

50. The surgical tool of claim 49, wherein rotation of said cam cylinder causes said at least one cam path to move relative to and cause translation of at least one said cam follower.

51. The surgical tool of claim 38, wherein said impulse source imparts angular and linear momentum to said auger and said cutter before said auger and said cutter contact the wall of the vessel.

52. The surgical tool of claim 17, wherein said auger comprises at least one flute.

53. The surgical tool of claim 52, wherein said at least one flute has a pitch, and wherein said pitch of said flute pulls tissue proximally faster than said cutter advances.

54. A method for creating an opening in a vessel wall within a patient, comprising:

advancing a piercing member and a cutter through the vessel wall, said cutter axially

fixed to and positioned at least partially around said piercing member, wherein



said advancing cuts tissue from the vessel wall; and  
retracting said piercing member and said cutter, whereby the cut tissue is removed  
from the vessel wall to form an opening therein.

55. The method of claim 54, further comprising releasing a quantity of stored energy, wherein said releasing drives said advancing.

56. The method of claim 55, wherein said releasing produces an impulsive force on said auger and said cutter.

57. The method of claim 54, further comprising providing hemostasis at the opening.

58. The method of claim 54, further comprising rotating said auger and said cutter.

59. The method of claim 54, wherein said auger comprises at least one flute, said at least one flute engaging the tissue plug.

60. The method of claim 59, wherein said auger pulls the vessel wall proximally while said cutter advances distally.

61. The method of claim 59, wherein said auger holds the tissue plug intramurally.

## **APPENDIX 2 – EVIDENCE APPENDIX**

Exhibit 1 ..... MCGRAW HILL DICTIONARY OF SCIENTIFIC AND TECHNICAL TERMS, FOURTH EDITION 555, 2022 (1989)

Exhibit 2 ..... WEBSTER'S NEW WORLD DICTIONARY, SECOND COLLEGE EDITION 528, 1215 (1978).

Exhibit 3 ..... Attachment to Office Action mailed March 25, 2004

On the cover: Pattern produced from white light by a computer-generated diffraction plate containing 529 square apertures arranged in a 23 x 23 array. (R. B. Hoover, Marshall Space Flight Center)

On the title pages: Aerial photograph of the Sinai Peninsula made by Gemini spacecraft. (NASA)

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In addition, material has been drawn from the following references: R. E. Huschke, *Glossary of Meteorology*, American Meteorological Society, 1959; *U.S. Air Force Glossary of Standardized Terms*, AF Manual 11-1, vol. 1, 1972; *Communications-Electronics Terminology*, AF Manual 11-1, vol. 3, 1970; W. H. Allen, ed., *Dictionary of Technical Terms for Aerospace Use*, 1st ed., National Aeronautics and Space Administration, 1965; J. M. Gilliland, *Solar-Terrestrial Physics: A Glossary of Terms and Abbreviations*, Royal Aircraft Establishment Technical Report 67158, 1967; *Glossary of Air Traffic Control Terms*, Federal Aviation Agency; *A Glossary of Range Terminology, White Sands Missile Range, New Mexico*, National Bureau of Standards, AD 467-424; *A DOD Glossary of Mapping, Charting and Geodetic Terms*, 1st ed., Department of Defense, 1967; P. W. Thrush, comp. and ed., *A Dictionary of Mining, Mineral, and Related Terms*, Bureau of Mines, 1968; *Nuclear Terms: A Glossary*, 2d ed., Atomic Energy Commission; F. Casey, ed., *Compilation of Terms in Information Sciences Technology*, Federal Council for Science and Technology, 1970; *Glossary of Stinfo Terminology*, Office of Aerospace Research, U.S. Air Force, 1963; *Naval Dictionary of Electronic, Technical, and Imperative Terms*, Bureau of Naval Personnel, 1962; *ADP Glossary*, Department of the Navy, NAVSO P-3097.

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sugars which yield two monosaccharide units upon hydrolysis. {di'sak-ə-rid}

**disappearing carriage** [ORD] A movable part for raising a heavy gun above a parapet and lowering it automatically after firing. {di'sə-pir-iŋ, kəri-j}

**disappearing filament pyrometer** See optical pyrometer. {di'sə-pir-iŋ, fili-ə-mənt pi'rə-məd-ər}

**disappearing stair** [BUILD] A stair that can be swung up into a ceiling space. {di'sə-pir-iŋ 'ster}

**disappearing target** [ORD] Target that is exposed to the firer's view for a short time; for example, bobbing targets or targets raised from target pits for short periods of time. {di'sə-pir-iŋ 'tär-gət}

**disarm** [ORD] To remove the detonating device or fuse of a bomb, mine, or other piece of explosive ordnance, or otherwise render it incapable of exploding in its usual manner. {dis'arm}

**disassemble** [COMPUT SCI] To translate a program from machine language to assembly language to aid in its understanding. [ENG] To take apart into constituent parts. {dis-ə'sem-bəl}

**disassembler** [COMPUT SCI] A program that translates machine language into assembly language. {dis-ə'sem-blər}

**disaster dump** [COMPUT SCI] A listing of the contents of a computer's central processing unit that is created when the computer detects an error that it cannot handle in the course of processing. {di'zast-ər, dəmp}

**Disasteridae** [PALEON] A family of extinct burrowing, exocyclic Euechinoidea in the order Holasteroidea comprising mainly small, ovoid forms without fascioles or a plastron. {dis-ə'ster-ə, də}

**disc** See disk. {disk}

**DISC** See differential scatter. {disk}

**discarding petal** [ORD] A part of a discarding sabot that is composed of a base and attached pieces, or petals, which surround the core, and are peeled back under centrifugal and aerodynamic forces and discarded just in front of the gun muzzle. {di'skär-diŋ 'pet-əl}

**Discellaceae** [MYCOL] A family of fungi of the order Sphaeropsidales, including saprophytes and some plant pathogens. {dis-ə'lās-ē, ē}

**discharge** [ELEC] To remove a charge from a battery, capacitor, or other electric-energy storage device. [ELECTR] The passage of electricity through a gas, usually accompanied by a glow, arc, spark, or corona. Also known as electric discharge. [FL MECH] The flow rate of a fluid at a given instant expressed as volume per unit of time. {dis, chärj}

**discharge channel** [MECH ENG] The passage in a pressure-relief device through which the fluid is released to the outside of the device. {dis, chärj, chan-əl}

**discharge coefficient** [FL MECH] In a nozzle or other constriction, the ratio of the mass flow rate at the discharge end of the nozzle to that of an ideal nozzle which expands an identical working fluid from the same initial conditions to the same exit pressure. Also known as coefficient of discharge. {dis, chärj kōi'fish-ənt}

**discharged solids** See residue. {dis, chärjd 'säl-əd-z}

**discharge head** [MECH ENG] Vertical distance between the intake level of a water pump and the level at which it discharges water freely to the atmosphere. {dis, chärj, hed}

**discharge hydrograph** [CIV ENG] A graph showing the discharge or flow of a stream or conduit with respect to time. {dis, chärj, hi-drə-graf}

**discharge key** [ELEC] Device for switching a capacitor suddenly from a charging circuit to a load through which it can discharge. {dis, chärj, kē}

**discharge lamp** [ELECTR] A lamp in which light is produced by an electric discharge between electrodes in a gas (or vapor) at low or high pressure. Also known as electric-discharge lamp; gas-discharge lamp; vapor lamp. {dis, chärj, lamp}

**discharge line** [ENG] The length of pipe through which drilling mud travels from the mud pump through the standpipe on its way to the borehole. {dis, chärj, līn}

**discharge liquor** [CHEM ENG] Liquid that has passed through a processing operation. Also known as effluent; product. {dis, chärj, lik-ər}

**discharge printing** [GRAPHICS] A method of printing in which an electric discharge is shaped to produce characters. [TEXT] Using bleaching chemicals on a previously dyed fabric

to remove the dye and thus imprint a pattern. {dis, chärj, print-iŋ}

**discharger** [ELEC] A silver-impregnated cotton wick encased in a flexible plastic tube with an aluminum mounting lug, used on aircraft to reduce precipitation static. {dis, chärj-ər}

**discharge tube** [ELECTR] An evacuated enclosure containing a gas at low pressure, through which current can flow when sufficient voltage is applied between metal electrodes in the tube. Also known as electric-discharge tube. [MECH ENG] A tube through which steam and water are released into a boiler drum. {dis, chärj, tüb}

**discharge-tube leak indicator** [ENG] A device which detects the presence of a tracer gas by using a glass tube attached to a high-voltage source; the presence of leaked gas is indicated by the color of the electric discharge. {dis, chärj, tüb 'lēk, in-də, käd-ər}

**discharging agent** [TEXT] A stripping agent such as sodium hyposulfite which is used to remove dyes from fabric that has been vat-dyed or printed. {dis, chärj-iŋ, ā-jənt}

**discharging arch** [CIV ENG] A support built over, and not touching, a weak structural member, such as a wooden lintel, to carry the main load. Also known as relieving arch. {dis, chärj-iŋ, ārch}

**discifloral** [BOT] Having flowers with enlarged, disklike receptacles. {dis, kə, flōr-əl}

**disciform** [BIOL] Disk-shaped. {dis, kə, fōrm}

**Discinacea** [INV ZOO] A family of inarticulate brachiopods in the suborder Acrotetridina. {dis, kə, nās-ē-ə}

**disclimax** [ECOL] A climax community that includes foreign species following a disturbance of the natural climax by man or domestic animals. Also known as disturbance climax. {dis, kli-maks}

**discoaster** [BOT] A star-shaped coccolith. {dis, kō-ə-stər}

**discoblastula** [EMBRYO] A blastula formed by cleavage of a meroblastic egg; the blastoderm is disk-shaped. {dis, kō, blas-chə-lə}

**discocephalous** [INV ZOO] Having a sucker on the head. {dis, kō, sef-ə-ləs}

**discocaster** [INV ZOO] A type of spicule with eight rays terminating in discs in hexactinellid sponges. {dis, kāk-tə-stər}

**discodactylous** [VERT ZOO] Having sucking disks on the toes. {dis, kō, dak-təl-əs}

**discogastrula** [EMBRYO] A gastrula formed from a blastoderm. {dis, kō, gas-trə-lə}

**Discoglossidae** [VERT ZOO] A family of anuran amphibians in and typical of the suborder Opisthocoela. {dis, kō, glās-ə, də}

**discoid** [BIOL] 1. Being flat and circular in form. 2. Any structure shaped like a disc. {dis, kōid}

**discoidal cleavage** [EMBRYO] A type of cleavage producing a disc of cells at the animal pole. {dis, kōid-əl 'klē-vij}

**Discoidiidae** [PALEON] A family of extinct conical or globular, exocyclic Euechinoidea in the order Holecypoida distinguished by the rudiments of internal skeletal partitions. {dis, kōi, di-ə, də}

**Discolichenes** [BOT] The equivalent name for Lecanorales. {dis, kō, li, kē-nēz}

**Discolomidae** [INV ZOO] The tropical log beetles, a family of coleopteran insects in the superfamily Cucujoidea. {dis, kō, lām-ə, də}

**discomfort glare** See glare. {dis, kəm-fərt, glər}

**discomfort index** See temperature-humidity index. {dis, kəm-fərt, in, deks}

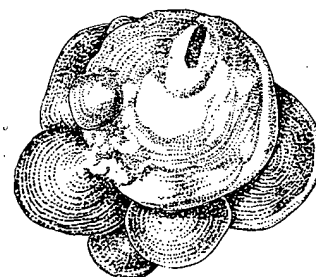
**discomposition** [NUCLEO] The process in which an atom is knocked out of its position in a crystal lattice by direct nuclear impact, as by fast neutrons or by fast ions that have been previously knocked out of their lattice positions. {dis, kəm-pə, zish-ən}

**discomposition effect** [NUCLEO] Changes in physical or chemical properties of a substance caused by discomposition. Also known as Wigner effect. {dis, kəm-pə, zish-ən i, fekt}

**Discomycetes** [MYCOL] A group of fungi in the class Ascomycetes in which the surface of the fruiting body is exposed during maturation of the spores. {dis, kō, mī'sēd-ēz}

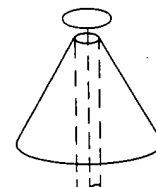
**discone antenna** [ELECTROMAG] A biconical antenna in which one of the cones is spread out to 180° to form a disk; the center conductor of the coaxial line terminates at the center of

## DISCINACEA



A cluster of *Discinacea*. (From R. C. Moore, ed., *Treatise on Invertebrate Paleontology*, pt. H, Geological Society of America, Inc., and University of Kansas Press, 1965)

## DISCONE ANTENNA



A high-frequency discone antenna.

generally acquired during sexual intercourse; includes gonorrhea, syphilis, chancroid, granuloma inguinale, and lymphogranuloma venereum. Abbreviated VD. {və'nir-ē-əl di'zēz}  
**venereal wart** [MED] A warty growth of the penis, frequent in some parts of the world, and probably acquired during sexual intercourse. {və'nir-ē-əl wɔrt}

**venetian cloth** [TEXT] A wool or cotton fabric with a smooth texture and a warp face. {və'nēsh-ən 'klōth}

**Venetian red** [INORG CHEM] A pigment with a true red hue; contains 15-40% ferric oxide and 60-80% calcium sulfate. {və'nēsh-ən 'red}

**venetian rose point** See rose point. {və'nēsh-ən 'rōz, pɔint}

**venipuncture** [MED] A surgical puncture of a vein, such as for withdrawing blood or injecting medication. {ven-ə,pəŋk-čər}

**venite** [PETR] Migmatite having mobile portions which were formed by exudation from the rock itself. {vē,nīt}

**Venn diagram** [MATH] A pictorial representation of set theoretic operations such as union, intersection, and complementation of sets. {ven,dī-ə,gram}

**venom** [PHYSIO] Any of various poisonous materials secreted by certain animals, such as snakes or bees. {ven-əm}

**venous pressure** [PHYSIO] Tension of the blood within the veins. {vē-nəs, presh-ər}

**vent** [ENG] 1. A small passage made with a needle through stemming, for admitting a squib to enable the charge to be lighted. 2. A hole, extending up through the bearing at the top of the core-barrel inner tube, which allows the water and air in the upper part of the inner tube to escape into the borehole. 3. A small hole in the upper end of a core-barrel inner tube that allows water and air in the inner tube to escape into the annular space between the inner and outer barrels. 4. An opening provided for the discharge of pressure or the release of pressure from tanks, vessels, reactors, processing equipment, and so on. [GEOL] The opening of a volcano on the surface of the earth. [MET] A small opening in a casting mold to allow for the escape of gases. [ZOO] The external opening of the cloaca or rectum, especially in fish, birds, and amphibians. {vent}

**vent da Mùt** [METEOROL] A strong, wet wind of Lake Garda in Italy. {vent dā 'müt}

**vent des dames** [METEOROL] A daily sea breeze of about 15 miles (24 kilometers) per hour from the southwest in summer on the Mediterranean coast east of the Rhone delta, extending some 20 miles (32 kilometers) inland. {vɔn de 'dām}

**vent du midi** [METEOROL] A south wind in the center of the Massif Central and the southern Cevennes (France); it is warm, moist, and generally followed by a southwest wind with heavy rain. {vɔn dyü me'dē}

**vented baffle** See reflex baffle. {'ven-təd 'baf-əl}

**vented battery** [ELEC] A nickel-cadmium or other battery which lacks provisions for recombination of gases produced during normal operation, so that these gases must be vented to the atmosphere to avoid rupture of the cell case. {'ven-təd 'bād-ə-rē}

**venter** [ANAT] The abdomen, or other body cavity containing organs. [BOT] The thickened basal portion of an archegonium. [INV ZOO] 1. The undersurface of an arthropod's abdomen. 2. The outer, convex part of a curved or coiled gastropod or cephalopod shell. {'ven-tər}

**ventifact** [GEOL] A stone or pebble whose shape, wear, faceting, cut, or polish is the result of sandblasting. Also known as glyptolith; rillstone; wind-cut stone; wind-grooved stone; wind-polished stone; wind-scoured stone; wind-shaped stone. {'ven-tə,fakt}

**ventilation** [ENG] Provision for the movement, circulation, and quality control of air in an enclosed space. [METEOROL] The process of causing representative air to be in contact with the sensing elements of observing instruments; especially applied to producing a flow of air past the bulb of a wet-bulb thermometer. {'vent-əl-ā-shən}

**ventilator** [ENG] A device with an adjustable aperture for regulating the flow of fresh or stagnant air. [MECH ENG] A mechanical apparatus for producing a current of air, as a blowing or exhaust fan. {'vent-əl-ād-ər}

**vento di sotto** [METEOROL] Breezes blowing up-lake on Lake Garda in Italy. {'ventō di 'sō-tō}

**ventral** [BOT] On the lower surface of a dorsiventral plant structure, such as a leaf. [ZOO] On or belonging to the lower

or anterior surface of an animal, that is, on the side opposite the back. {'ven-trəl}

**ventral aorta** [VERT ZOO] The arterial trunk or trunks between the heart and the first aortic arch in embryos or lower vertebrates. {'ven-trəl ā'ōrd-ə}

**ventral hernia** [MED] A hernia of the abdominal wall not involving the umbilical, femoral, or inguinal openings. Also known as abdominal hernia. {'ven-trəl 'hərnē-ə}

**ventralia** [INV ZOO] Paired sensory bristles on the ventral aspect of the head of gnathostomulids. {'ven-tral-yə}

**ventral light reflex** [INV ZOO] A basic means of orientation in aquatic invertebrates, such as shrimp, which swim belly up toward the light. {'ven-trəl 'līt, rē, fleks}

**ventral rib** [VERT ZOO] Any of the ribs which lie in the septa dividing the trunk musculature into segments in fish. Also known as pleural rib. {'ven-trəl 'rib}

**ventricle** [ANAT] 1. A chamber, or one of two chambers, in the vertebrate heart which receives blood from the atrium and forces it into the arteries by contraction of the muscular wall. 2. One of the interconnecting, fluid-filled chambers of the vertebrate brain that are continuous with the canal of the spinal cord. [ZOO] A cavity in a body part or organ. {'ven-trə-kəl}

**ventricose** [BIOL] Swollen or distended, especially on one side. {'ven-trə-kōs}

**ventricular depolarization complex** See QRS complex. {'ven-trik-yə-lər di,pō-lə-rə-zā-shən,kām,pleks}

**ventricular septum** See interventricular septum. {'ven-trik-yə-lər 'septəm}

**ventriculus** [ZOO] A ventricle that performs digestive functions, such as a stomach or a gizzard. {'ven-trik-yə-ləs}

**ventromedial nucleus** [ANAT] A central nervous system nucleus in the hypothalamus that appears to be the satiation center; bilateral surgical damage to this nucleus results in overeating. {'ven-trō-mēd-ē-əl 'nū-klē-əs}

**vent stack** [BUILD] The portion of a soil stack above the highest fixture. {'vent, stak}

**Venturian** [GEOL] A North American stage of middle Pliocene geologic time, above Répétian and below Wheelerian. {'ven'chū-rē-ən}

**venturi flume** [ENG] An open flume with a constricted flow which causes a drop in the hydraulic grade line; used in flow measurement. {'ven-tūr-ē, flūm}

**venturi meter** [ENG] An instrument for efficiently measuring fluid flow rate in a piping system; a nozzle section increases velocity and is followed by an expanding section for recovery of kinetic energy. {'ven-tūr-ē, mēd-ər}

**venturi scrubber** [CHEM ENG] A gas-cleaning device in which liquid injected at the throat of a venturi is used to scrub dust and mist from the gas flowing through the venturi. {'ven-tūr-ē 'skrəb-ər}

**venturi tube** [ENG] A constriction that is placed in a pipe and causes a drop in pressure as fluid flows through it, consisting essentially of a short straight pipe section or throat between two tapered sections; it can be used to measure fluid flow rate (a venturi meter), or to draw fuel into the main flow stream, as in a carburetor. {'ven-tūr-ē, tūb}

**venule** [ANAT] A small vein. {'ven-yūl}

**Venus** [ASTRON] The planet second in distance from the sun; the linear diameter, about 7500 miles (12,200 kilometers); includes the top of a cloud layer; the diameter of the solid globe is about 30 miles (50 kilometers) less; the mass is about 0.815 (earth = 1). {'vē-nəs}

**Venus' flytrap** [BOT] *Dionaea muscipula*. An insectivorous plant (order Sarraceniales) of North and South Carolina: the two halves of a leaf blade can swing upward and inward as though hinged, thus trapping insects between the closing halves of the leaf blade. {'vē-nəs 'flī, trəp}

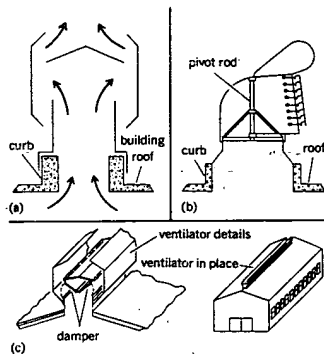
**Venus hairstone** See rutulated quartz. {'vē-nəs 'her, stōn}

**Venus probe** [AERO ENG] A probe for exploring and reporting on conditions on or about the planet Venus, such as Pioneer and Mariner probes of the United States, and Venera probes of the Soviet Union. {'vē-nəs 'prōb}

**veranillo** [CLIMAT] The lesser dry season, made up of a few weeks of hot dry weather, that breaks up the summer rainy season on the Pacific coast of Mexico and Central America. {'vē-rə-nēl-yō}

**verano** [CLIMAT] In Mexico and Central America, the main

## VENTILATION



Roof exhausts for natural ventilation. (a) Cross section of round ventilator and (b) of rotating-head ventilator. (c) Continuous roof ventilator.

## VENUS' FLYTRAP



Venus' flytrap (*Dionaea muscipula*). The leaves capture insects.

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akin ? to ON. *fitja*, to knit, tie ends of thread, akin to OHG. *fizza*, skein of thread, ult. < IE. \**pedyo-*, of the foot < base \**ped-*, foot) 1. to be suitable or adapted to; be in accord with [let the punishment *fit* the crime] 2. to be the proper size, shape, etc. for 3. a) to make or alter so as to fit b) to measure (a person) for something that must be fitted [fit him for a brace] 4. to make suitable or qualified [his training *fits* him for the job] 5. a) to insert, as into a receptacle [to *fit* a key in a lock] b) to make a place for (with *in* or *into*) [to *fit* another passenger into the crowded car] 6. to equip; outfit (often with *out*) —vi. 1. to be suitable or proper 2. to be suitably adapted; be in accord or harmony (often with *in* or *into*) 3. to have the proper size or shape for a particular figure, space, etc. [his coat *fits* well, this won't *fit* into the box] —adj. *fit*, *fit*, *fit* [ME. *fyt*] 1. adapted, adjusted, qualified, or suited to some purpose, function, situation, etc. [food *fit* to eat] 2. proper; right; appropriate 3. in good physical condition; healthy 4. [Colloq.] disturbed enough; inclined [she was *fit* to scream] —n. [prob. < the v.] 1. the condition of fitting or being fitted 2. the manner or degree of fitting or of fitting together [a good *fit*, a tight *fit*] 3. anything that fits —*fit* to be tied [Colloq.] frustrated and angry

**SYN.**—*fit*, the broadest term here, means having the qualities or qualifications to meet some condition, circumstance, purpose, or demand [fit for a king]; *suitable* is applied to that which accords with the requirements or needs of the occasion or circumstances [shoes *suitable* for hiking]; *proper* implies reference to that which naturally or rightfully belongs to something or suggests a fitness or suitability dictated by good judgment [proper respect for one's elders]; that is *appropriate* which is especially or distinctively fit or suitable; *fitting* is applied to that which accords harmoniously with the character, spirit, or tone of something; apt, in this connection, is used of that which is exactly suited to the purpose [an apt phrase]

**fit** (fit) n. [ME. < OE. (rare) *fit*, conflict] 1. any sudden, uncontrollable attack; paroxysm [a *fit* of coughing] 2. a) a sharp, brief display of feeling [a *fit* of anger] b) a transient mood [a *fit* of the blues] 3. a temporary burst of activity 4. Med. a seizure in which the victim loses consciousness or has convulsions or both —by fits (and starts) in an irregular way; in bursts of activity followed by periods of inactivity —have (or *throw*) a *fit* [Colloq.] to become very angry or upset

**fit** (fit) n. [ME. *fitte* < OE. *fit*, akin to OS. (Latinized) pl. *vitae*, sections of a poem (the *Heliand*), OHG. *fizza*: see *fit*] [Archaic] a short section of a poem, ballad, or song

**fit** (fitch) n. [ME. *ficheu* < OFr. *fichau* < MDu. *viische*, akin to OHG. *wiessa*, WEASEL] 1. same as POLECAT (sense 1) 2. its pelt or fur Also *fitch*/et (-it), *fitch*/ew (-oo)

**Fitch** (fitch) 1. (William) Clyde, 1865–1909; U.S. playwright 2. John, 1743–98; U.S. inventor of a steamboat

**Fitchburg** (fitch/burg) [after John Fitch, local civic leader] city in N. Mass.: pop. 43,000

**fit-ful** (fit/fəl) adj. [FIT + -FUL] characterized by irregular or intermittent activity, impulses, etc.; spasmodic; restless —*fit-ful-ly* adv. —*fit-ful-ness* n.

**fit-ly** (fit/lē) adv. 1. in a fit manner; suitably 2. at the right time

**fit-ment** (-mənt) n. [Chiefly Brit.] any of various furnishings, fixtures, or detachable parts

**fit-ness** (-nis) n. the condition of being fit; suitability, appropriateness, healthiness, etc.

**fit-ted** (fit/tid) adj. designed to conform to the contours of that which it covers [fitted bed sheets, a fitted coat]

**fit-ter** (-ər) n. a person who fits; specif., a) a person who alters or adjusts garments to fit b) a person who supplies, installs, or adjusts machinery, pipes, etc.

**fit-ting** (-in) adj. suitable; proper; appropriate —n. 1. an adjustment or trying on of clothes, etc. for fit 2. a small part used to join, adjust, or adapt other parts, as in a system of pipes 3. [pl.] the fixtures, furnishings, or decorations of a house, office, automobile, etc. —**SYN.** see *fit* —*fit-ting-ly* adv.

**Fitz-Ger-ald** (fits/ger/əld), Edward (born Edward Purcell) 1809–83; Eng. poet & translator of *The Rubáiyát*: also written Fitzgerald

**Fitz-ger-ald** (-jer/əld), F(rancis) Scott (Key) 1896–1940; U.S. author

**Fiu-me** (fyoo/me) former (It.) name of RIJEKA

**five** (fiv) adj. [ME. < OE. *fiif*, with assimilated nasal, akin to G. *fünf* (OHG., Goth. *fimf*) < IE. base \**penkue-*, whence Sans. *pāñca*, Gr. *pente*, L. *quinque*] totaling one more than four —n. 1. the cardinal number between four and six; 5; V 2. any group of five people or things, esp. a basketball team 3. something numbered five or having five units, as a) a playing card, domino, face of a die, etc. b) [Colloq.] a five-dollar bill

**five-and-ten-cent store** (-n ten/sent/) a store that sells a wide variety of inexpensive merchandise, orig. with many articles priced at five or ten cents: also *five-and-ten*, *five-and-dime* (-n dime/) n.

**Five Civilized Tribes** the Cherokee, Chickasaw, Choctaw, Creek, and Seminole tribes of the Indian Territory (now the eastern part of Oklahoma)

**five-finger** (-fin/gor) n. [OE. *fifingre*] 1. same as CINQUE-FOIL (sense 1) 2. same as VIRGINIA CREEPER 3. any of various plants having leaves with five parts or flowers with five petals

**five-fold** (-föld/) adj. [see FOLD] 1. having five parts 2. having five times as much or as many —adv. five times as much or as many

**five hundred** a variety of euchre or rummy in which the object is to score five hundred points

**Five Nations** a confederation of Iroquoian Indians, including the Mohawks, Oneidas, Onondagas, Cayugas, and Senecas: see also SIX NATIONS

**five-er** (fi/vər) n. [Slang] 1. a five-dollar bill 2. [Brit.] a five-pound note

**fives** (fivz) n. [*< ?* five fingers of the hand] a kind of handball played in England

**fix** (fiks) vt. *fixed*, *fix*/ing [ME. *fixen* < *fix*, fixed < L. *fixus*, pp. of *figere*, to fasten, attach: for IE. base see FINISH] 1. a) to make firm, stable, or secure b) to fasten or attach firmly 2. to set firmly in the mind 3. a) to direct steadily [to *fix* the eyes on a target] b) to direct one's eyes steadily at [to *fix* the target] 4. to make rigid or stiff [to *fix* one's jaw] 5. to make permanent or lasting [color is *fixed* in dyeing] 6. to arrange or establish definitely; set [to *fix* the date of a wedding] 7. to arrange properly or in a certain way; set in order; adjust 8. to restore to proper condition; repair, mend, remedy, heal, etc. 9. to bank, refuel, and tend (a fire) 10. to prepare and cook (food or meals) 11. to preserve (a specimen) so that its tissue, etc. can be used for microscopic study 12. [Colloq.] to influence the result or action of (a horse race, jury, election, etc.) to one's advantage by bribery, trickery, etc. 13. [Colloq.] to revenge oneself on; get even with; punish or chastise 14. [Colloq.] to spay or castrate 15. *Chem.* a) to make solid or nonvolatile b) to cause (atmospheric nitrogen) to combine with other elements or compounds to form nitrates, ammonia, etc. 16. *Photog.* to make (a film, print, etc.) permanent and prevent from fading by washing in a chemical solution —vi. 1. to become fixed, firm, or stable 2. [Colloq. or Dial.] to prepare or intend [I'm *fixing* to go hunting] —n. 1. the position of a ship or aircraft determined from the bearings of two or more known points or from radio signals 2. [Colloq.] a difficult or awkward situation; predicament 3. [Slang] a) the act of fixing the outcome of a contest, situation, etc. b) a contest, situation, etc. that has been fixed 4. [Slang] an injection of a narcotic, as heroin, by an addict —**SYN.** see *PREDICAMENT*

**fix on** (or *upon*) to choose; settle on —*fix up* [Colloq.] 1. to repair, mend, remedy, etc. 2. to arrange properly; set in order 3. to make arrangements for —*fix-a-ble* adj.

**fix-ate** (fik/sāt) vt. vi. -at-ed, -at-ing [*< ML. fixatus*, pp. of *fixare*: see *fix*] to make or become fixed; specif., 1. to direct and focus (the eyes) on (a point or object) 2. *Psychoanalysis* to attach or arrest (the expression of the libidinal or aggressive drive) at an early stage of psychosexual development

**fix-a-tion** (fik/sā/shən) n. [ME. *fixacioun* < ML. *fixatio* < *fixatus*: see *prec.*] 1. a fixing, or fixating, or a being fixed, or fixated; specif., a) the directing and focusing of the eyes b) popularly, an exaggerated preoccupation; obsession 2. *Chem.* a) reduction into a solid or nonvolatile form b) the fixing of atmospheric nitrogen: see NITROGEN FIXATION 3. *Photog.* the treatment of a film, print, etc. to make it permanent 4. *Psychoanalysis* an arrest of the expression of the libidinal or aggressive drives at an early stage of psychosexual development, or a persistent attachment to some object or person that derives from this

**fix-a-tive** (fik/sā tiv) adj. [FIX + -ATIVE] that is able or tends to make permanent, prevent fading, etc. —n. a substance that makes something permanent, prevents fading, etc., as a mordant

**fixed** (fiks) adj. 1. firmly placed or attached; not movable 2. established; settled; set [a *fixed* price] 3. steady; unmoving; resolute [a *fixed* purpose] 4. remaining in the same position relative to the earth [a *fixed* satellite] 5. persisting obstinately in the mind and tending to control the thoughts and action; obsessive [a *fixed* idea] 6. *Chem.* a) nonvolatile: see *FIXED OIL* b) incorporated into a stable compound from its free state, as atmospheric nitrogen 7. [Colloq.] supplied with something needed, specif. money [comfortably *fixed* for life] 8. [Slang] with the outcome dishonestly arranged beforehand [a *fixed* race] —*fix-ed-ly* (fik/sid lē) adv. —*fix-ed-ness* n.

**fixed charge** any of certain charges, as taxes, rent, interest, etc., which must be paid, usually at regular intervals, without being changed and without reference to the amount of business done

**fixed oil** a nonvolatile oil, esp. one found in fatty animal tissue and the seeds of some plants

**fixed star** a star whose great distance from the earth makes it appear to keep the same position in relation to other stars

**fix-er** (fik/sər) n. 1. a person or thing that fixes 2. [Colloq.] a person who pays bribes or uses his influence to manipulate results, as in keeping others from being punished for illegal acts 3. [Slang] a person who sells narcotics illegally to addicts

**fix-ings** (-sinz) n. pl. 1. [Colloq.] accessories or trimmings [roast turkey and all the *fixings*] 2. pl. -ties anything fixed

**fix-i-ty** (-sē tē) n. 1. the quality or state of being fixed; steadiness or permanence 2. pl. -ties anything fixed

**fixt** (fiks) poet. pl. and pp. of *fix*

**fix-ture** (fiks/char) n. [*< ME. fixure* (< LL. *fixura* < L.

*fixus*: see in place 2 etc. attac legally a thing that seem fixe regularly

**fizz** (fiz) n. effervesce

*fiz*/zing 1 off gas bu

**fiz-zle** (fiz) silently, a

a hissing a successf sputtering failure; fi

**fizz-y** (-ē) fjeid (fvel

plateau in fjord (fyōr)

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fl. 1. floor

flour: Fla. Florid

flab (flab)

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flab-ber-g: AGHAST] 1

—**SYN.** se

flab-by (fi)

1. lacking

2. lacking

fla-bel-lat

shaped; al

fla-bel-lur

flabrum, a

1. a large

monial oc

of the bod

flac-cid (fi)

1. hanging

[flaccid m

cid/-ty n.

\*flack' (fla

[Slang] to

flack' (flak

fla-con (f

flask with

flag' (flag)

flutter") I

staff, with

used as a

standard;

as on a h

certain do

cardboard

may be fo

lines exte

note is an

to decorat

flag; esp.,

message) I

dip the fla

(or one's)

flag' (flag)

base \*plā

same as f

flagstones

flag' (flag)

wild irises

blue, or y

2. same as

or leaf of

flag' (flag)

flakken <

strike) 1.

weak or ti

\*Flag Day

the U.S. fi

people giv

flags in to

flag-el-lan

one who w

discipline

flagellatio

flag-el-late

-lat/ing <

< flagellur

beat, when

having a fl

like a flage

flag-el-la-t

LL. (Ec.) J

fat, āpe, cār

o for a in ag

ū, Fr. duc;

# retrace

# re-trace

# I215

# return

most coat of the back part of the  
sensitive to light, in part an  
nerve fibers: the image formed by  
s carried to the brain by the optic  
ret<sup>1</sup>-nal adj.  
n ak'ya lam) n., pl. -u-la (-la)  
ch holds back, tether < *retinere*, to  
Biol. an often hooked structure,  
old parts, seeds, eggs, etc. together  
u-lar (-lar) adj.  
(ARD) + -INE) a substance found  
amounts, that retards the growth

n. [RETIN(A) + -ENE] Biochem.  
oid, C<sub>20</sub>H<sub>30</sub>O, liberated when rho-  
transformed by the action of light  
C<sub>20</sub>H<sub>30</sub>O, formed by the action of

s) n. [ModL.: see RETINA & -ITIS]  
tina  
a sköp' n. [see RETINA & -SCOPE]

äs'kə pē) n. [< RETINA + -SCOPY]  
et'1-no-scop'ic (-ə sköp'ik) adj.  
vō' n. [ME. *reteneu* < OFr., fem.  
see RETAIN] a body of assistants,  
attending a person of rank or im-  
and retainers

d', -tir'ing [Fr. *retirer* < re-, back  
go away, retreat, or withdraw to a  
cluded place 2. to go to bed 3. to  
le; retreat; withdraw 4. to give up  
areer, etc., esp. because of advanced  
r away, or seem to do so —vt. 1. to  
retreat (to retire troops from an  
money) out of circulation b) to take  
bonds, bills, etc.) 3. to cause to  
job, or office 4. to withdraw from  
machinery] \*5. Baseball, etc. to  
etc.) —SYN. see GO

1. withdrawn or apart from the  
cluded 2. a) that has given up one's  
etc., esp. because of advanced age  
d persons

a person who has retired from work  
retire (ant)

ent) n. 1. a retiring or being retired;  
om work, business, etc. because of  
seclusion b) a place of privacy or

that retires 2. drawing back from  
om publicity, etc.; reserved; modest;  
of RETAKE

vi. 1. to adapt the machinery of  
manufacture of a different product by  
dies 2. to reorganize to meet new  
conditions

en) n. [var. of RETORTION] Law a  
esp., in international law, mistreat-  
of the citizens or subjects of another  
lar mistreatment received

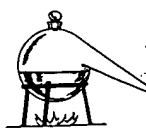
[< L. *retortus*, pp. of *retorque*, to  
ack & *torquere*, to twist: see TOR]  
epithet, deed, etc.) back upon the  
came 2. to answer (an argument,  
y in reply or response —vi. to reply;  
or witty way, or in kind —n. 1. a  
reply, esp. one that turns the words  
cer back upon himself 2. the act or  
ich reply —SYN. see ANSWER

r. *retorle* < ML. *retoria* < L., fem. of  
querre: see REC.

ally of glass and  
which substances  
laboratory 2. a  
teated to extract a  
o produce gas, etc.  
en) n. [ML. *retor-*  
of *retorque*: see  
ing, bending, or  
g turned, bent, or  
e as RETORSION

or n., also rē'tuch' vt. [Fr. *retoucher*  
to touch up or change details in a  
writing, etc.) in order to improve it  
(a negative or print) by adding details  
ies, etc. —n. 1. the act or process of  
it added or removed in retouching 3. a  
t has been retouched —re-touch'er n.

-traced', -trac'ing [Fr. *retracer*: see  
go back over again, esp. in the reverse  
one's steps] 2. to trace again the story  
ng 3. to go over again visually or in  
-able adj.



RETORT

retile  
retittle  
retold

re-trace (rē'trās') vt. -traced', -trac'ing to trace (a draw-  
ing, engraving, etc.) over again

re-tract (ri trakt') vt., vi. [ME. *retracten*: in sense 1 < L.  
*retractus*, pp. of *retrahere*, to draw back < re-, back +  
*trahere*, to draw; in sense 2 < MFr. *retracter* < L. *retractare*,  
to draw back, withdraw < re-, back + *tractare*, to pull,  
draw, freq. of *trahere*] 1. to draw back or in [to retract  
claws, to retract landing gear] 2. to withdraw or disavow  
(a statement, promise, offer, charge, etc.); recant or revoke  
—re-tract'a-bil'i-ty n. —re-tract'a-ble adj. —re-trac'tive  
adj.

re-trac-tile (ri trakt'īl, -til) adj. [Fr. *rétractile*] 1. that can  
be retracted, or drawn back or in, as the claws of a cat  
2. of retraction [*retractile* power] —re-trac-til-i-ty (rē'  
trak tīl'ē tē) n.

re-trac-tion (ri trakt'shən) n. [ME. *retraccion* < LL.  
*retractio*] 1. a retracting or being retracted; specif., a)  
withdrawal, as of a statement, promise, charge, etc. b)  
a drawing or being drawn back or in 2. power of retracting  
re-trac-tor (-tər) n. a person or thing that retracts; esp.,  
a) a muscle that retracts an organ, protruded part, etc.  
b) a surgical instrument or device for drawing back a part  
or organ, as the flesh at the edge of an incision

re-tral (rē'trāl) adj. [< L. *retro*, backward + -AL] at, near,  
or toward the back; posterior —re-tral-ly adv.

re-tread (rē'tred') vt. & n. *rē'tred'* vt. same as RECAP —n.  
1. same as RECAP \*2. [Slang] a person who is called back  
or returns to service, esp. military service

re-tread (rē'tred') vt. -trod', -trod'den or -trod', -tread'ing  
to tread again

re-treat (ri trēt') n. [ME. *retret* < OFr. *retraite* < pp. of  
*retrahere*, to draw back < L. *retrahere*: see RETRACT] 1. a  
going back or backward; withdrawal in the face of opposi-  
tion or from a dangerous or unpleasant situation 2. with-  
drawal to a safe or private place 3. a safe, quiet, or  
secluded place 4. a period of retirement or seclusion, esp.  
one devoted to religious contemplation away from the  
pressures of ordinary life, usually as a group activity  
5. an asylum for the aged, mentally ill, etc. 6. Mil. a) the  
withdrawal of troops, ships, etc. from a position, esp.  
when forced by enemy attack b) a signal for such a with-  
drawal c) a signal given by bugle or drum at sunset for  
lowering the national flag d) the ceremony at which this  
is done —vi. [ME. *retreten*] 1. to withdraw; go back; make  
a retreat; retire 2. to slope backward —vt. to lead or draw  
back; esp., Chess to move (a piece) back —SYN. see  
SHELTER —beat a retreat 1. Mil. to signal for retreat  
by beating a drum 2. to retreat; withdraw

re-trench (rē'trench') vt. [MFr. *retrencher*: see RE- &  
TRENCH] 1. to cut down or reduce (esp. expenses); curtail  
2. to cut off or out; omit or delete (a portion of a book)  
—vi. to reduce expenses; economize

re-trench-ment (-ment) n. [MFr.] 1. a retrenching; esp.,  
a reduction of expenses 2. Mil. a rampart or breastwork  
within or behind the main fortifications, to which troops  
can retreat in case the outer line is breached

ret-ri-bu-tion (ret'rī byōō'shən) n. [ME. *retribucio* <  
Ofr. *retribucio* < LL(Ec). *retribucio* < L. *retribuere*, pp.  
of *retribuere*, to repay < re-, back + *tribuere*, to pay: see  
TRIBUTE] 1. deserved punishment for evil done, or some-  
times, reward for good done; merited requital 2. Theol.  
reward or punishment in another life for things done in  
this —re-trib'u-tive (ri trīb'yōō tiv), re-trib'u-to-ry  
(-tōr'ē) adj. —re-trib'u-tive-ly adv.

re-triev-al (ri trēv'v'l) n. 1. the act or process of retrieving  
2. possibility of recovery or restoration

re-trieve (ri trēv') vt. -trieved', -triev'ing [ME. *retreven* <  
inflected stem of OFr. *retrouver* < re-, again + *trouver*, to  
find: see TROVER] 1. to get back; recover 2. to restore;  
revive (to retrieve one's spirits) 3. to rescue or save 4. to  
set right or repair (a loss, error, etc.); make good 5. to  
recall to mind \*6. to recover (information) from data  
stored in a computer 7. Hunting to find and bring back  
(killed or wounded game); said of dogs 8. Tennis, etc. to  
return (a ball that is hard to reach) —vi. Hunting to re-  
trieve game —n. a retrieval; esp., a retrieving of the ball  
in tennis, etc. —SYN. see RECOVER —re-triev'a-ble adj.

re-triev-er (-ər) n. 1. a person or thing that retrieves 2. a  
dog trained to retrieve game; specif., any of several breeds  
of dog developed for this purpose

ret-ro (ret'rō) n., pl. -ros clipped form of RETROCKET

ret-ro (-ret'rō, -rə; occas. rē'trō) [L. < *retro*, backward <  
re-, back + -tro, as in INTRO.] a combining form meaning  
backward, back, behind [*retroact*, *retroflex*]

ret-ro-act (ret'rō akt') vt. [< L. *retroactus*, pp. of *retroagere*,  
to drive back, reverse < *retro* (see prec.) + *agere*, to  
ACT] 1. to act in opposition; react 2. to have reference or  
application to or influence on things done in the past

ret-ro-ac-tion (-ak'shən) n. [RETRO + ACTION] 1. opposed,  
reverse, or reciprocal action; reaction 2. [RETROACT +  
-ION] effect, as of a law, on things done prior to its enact-  
ment or effectuation

re-train  
retransfer

retranslate  
re-treat

ret-ro-ac-tive (-ak'tiv) adj. [Fr. *rétroactif*: see RETROACT  
& -IVE] 1. having application to or effect on things prior  
to its enactment [a retroactive law] 2. going into effect as  
of a specified date in the past [a retroactive increase]  
—ret'ro-ac-tive-ly adv. —ret'ro-ac-tiv'i-ty n.

ret-ro-cede' (ret'rō sēd') vt. -ced'ed, -ced'ing [L. *retro-*  
*cedere*, to recede: see RETRO- & CEDE] to go back; recede  
—ret'ro-ces'sion (-sesh'ən) n.

ret-ro-cede' (ret'rō sēd') vt. -ced'ed, -ced'ing [Fr. *retrocéder*  
< ML. *retrocedere* < L.: see prec.] to cede or give back  
(territory) to —ret'ro-ces'sion (-sesh'ən) n.

ret-ro-choir (ret'rō kwir', rē'trā-) n. [RETRO- + CHOIR,  
after ML. *retrochorus*] that part of a church which lies  
behind the choir or the main altar

ret-ro-fire (ret'rō fir') vt. -fired', -fir'ing to ignite (a  
retrorocket) —vi. to become ignited: said of a retrorocket  
—n. the igniting of a retrorocket

ret-ro-fit (-fit') n. [RETRO- + FIT] a change in design,  
construction, or equipment, as of an aircraft or machine  
tool already in operation, in order to incorporate later  
improvements —vt., vi. -fit'ted, -fit'ting to modify or  
improve with a retrofit

ret-ro-flex (ret'rō fleks') adj. [L. *retroflexus*, pp. of *retro-*  
*flexere*: see RETRO- & FLEX] 1. bent or turned backward;  
reflexed 2. Phonol. pronounced with the tip of the tongue  
raised and bent slightly backward Also ret'ro-flexed' —n.  
Phonol. a retroflex sound

ret-ro-flex-ion, ret-ro-flec-tion (ret'rō flek'shən) n. 1.  
the condition of being retroflex; specif., Med. the bending  
backward of an organ, esp. of the body of the uterus, upon  
itself 2. Phonol. a) retroflex articulation b) the acoustic  
quality produced by this

ret-ro-grade (ret'rō grād') adj. [ME. < L. *retrogradus* <  
*retrogradi*, to go backward: see RETRO- & GRADE] 1.  
moving or directed backward; retreating or retreating 2.  
inverse or reverse: said of order 3. going back or tending  
to go back to an earlier, esp. worse, condition; retrogressive  
4. [Obs.] opposed; contrary 5. Astron. a) moving in an  
orbit opposite to the usual orbital direction of similar  
celestial bodies, as opposite to the direction of the earth  
in its journey around the sun b) designating motion, real  
or apparent, in a direction contrary to the order of the  
signs of the zodiac, or from east to west 6. Music designat-  
ing motion backward in a melody, specif. so as to begin  
with the last note and end with the first —vt. -grad'ed,  
-grad'ing [L. *retrogradi*] 1. to go, or seem to go, backward  
2. to become worse; decline; deteriorate; degenerate 3.  
Astron. to have a retrograde motion —ret'ro-gra-da'tion  
(-grā dā'shən) n. —ret'ro-grade-ly adv.

ret-ro-gress (ret'rō gres', ret'rō gres') vt. [L. *retrogressus*,  
pp. of *retrogradi*: see prec.] to move backward, esp. into an  
earlier, less complex, or worse condition; decline; degener-  
ate —ret'ro-gres'sive adj. —ret'ro-gres'sive-ly adv.

ret-ro-gres-sion (ret'rō gresh'ən) n. a retrogressing; esp.,  
Biol. a return to a lower, less complex stage or state;  
degeneration

ret-ro-len-tal (ret'rō len'tl) adj. [< RETRO- + L. *lens*, gen.  
*lentis* (see LENS) + -AL] situated behind the lens of the eye

ret-ro-rock-et, ret-ro-rock-et (ret'rō rāk'it) n. [RETRO-  
+ ROCKET] a small rocket on a larger rocket or spacecraft,  
that produces thrust in a direction opposite to the direction  
of flight in order to reduce speed, as for landing

re-trorse (ri trōrs') adj. [L. *retorsus*, contr. of *retroversus*,  
bent backward < *retro*, back + *versus*, pp. of *vertere*, to  
turn: see VERSE] Biol. bent or turned backward or down-  
ward —re-trorse-ly adv.

ret-ro-spect (ret'rō spekt') n. [< L. *retrospectus*, pp. of  
*retrospicere*, to look back < *retro*, back + *specere*, to look:  
see SPY] a looking back on or thinking about things past;  
contemplation or survey of the past —vi. [Rare] to look  
back in thought or refer back (to) —vt. [Rare] to look or  
think back on —in retrospect in reviewing the past

ret-ro-spec-tion (ret'rō spek'shən) n. [see RETROSPECT &  
-ION] 1. act, instance, or faculty of looking back on or  
reviewing past events, experiences, etc. 2. reference to a  
past event 3. a survey of past life, etc.

ret-ro-spec-tive (-tiv) adj. [see RETROSPECT & -IVE] 1.  
looking back on or directed to the past, past events, etc.  
2. looking or directed backward 3. applying to the past;  
retroactive —n. a representative exhibition of the lifetime  
work of an artist —ret'ro-spec-tive-ly adv.

ret-rous-sé (ret'rō sē) adj. [Fr., pp. of *retrousser*, to turn  
up: see RE- & TRUSS] turned up at the tip [a retrous-sé nose]

ret-ro-ver-sion (ret'rō ver'shən, -shən) n. [< L. *retroversus*  
(see RETRORSE) + -ION] 1. a looking or turning back 2. a  
turning or tilting backward (of an organ or part), esp. of  
the uterus

ret-si-na (ret'si nā) n. [ModGr., prob. < It. *resina* (< L.),  
RESIN] a white or red wine of Greece flavored with pine  
resin

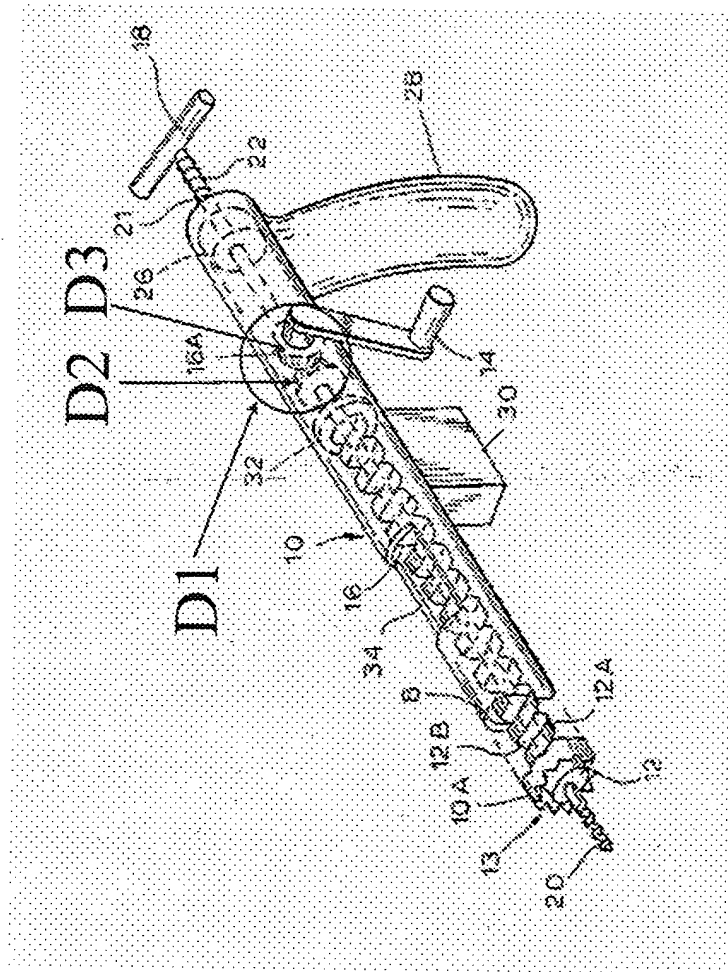
re-turn (ri turn') vt. [ME. *retournen* < OFr. *retourner*:  
see RE- & TURN] 1. to go or come back, as to a former

retrial  
retrim

retry  
retune

fat, āpe, cār; ten, ēven; is, bīte; gō, hōrn, tōōl, look; oil, out; up, fār; get; joy; yet; chin; she; thin, then; zh, leisure; ŋ, ring;  
e for a in ago, e in agent, i in sanily, o in comply, u in focus; ' as in able (ā'b'l); Fr. bāl; ē, Fr. cœur; ô, Fr. feu; Fr. mor; ô, Fr. cor;  
ū, Fr. duc; r, Fr. cri; H, G. ich; kh, G. doch. See inside front cover. \*Americanism; †foreign; ‡hypothetical; < derived from





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